

Te Uru Rākau



New Zealand Forest Service

Preparing land for planting native trees



**Te Kāwanatanga
o Aotearoa**
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Growing tree seedlings in greenhouses can boost their development by providing a controlled environment. Greenhouses protect seedlings from adverse conditions and ensure ideal settings for growth.



Well-prepared land accelerates tree growth, improves establishment and survival rates, and protects existing native plants. Good preparation also reduces competition from weeds and improves access for planting and ongoing management.

Preparing land for planting native trees

Land preparation is important for a successful planting operation. To prepare your site, you may need to clear pest plants (such as vine weeds, blackberry, or sycamore).

It's important to consider what plants are already on site. Some existing non-native plants, such as gorse, may help native plants grow by providing shelter.

Your site might also need fencing to keep out stock. You might need to put in simple tracks or roads to create access to the site and make maintenance easier. Other tasks you may need to do include:

- controlling animal pests such as deer, goats, hares or rabbits;
- intensive grazing to reduce grass cover;
- applying fertiliser.

Benefits of good land preparation

Getting your land preparation right at the start will help improve the conditions of your site to:

- accelerate tree growth, and support establishment and survival;
- protect existing native vegetation on the site;
- reduce competition from weeds;
- allow more time for releasing activity (applying herbicides or hand weeding);
- improve access for planting and ongoing management.

Before you start your land preparation

Before you start preparing your land you need to work out:

- why you want to plant;
- where you want to plant;
- what you are going to plant;
- when you want to plant.

This will help you work out the best way to prepare your land, when to start and what else you need to think about.

How to clear vegetation

Before you plant, you need to clear your land of competing vegetation like shade tolerant pest plants. The current vegetation cover will determine whether you need to clear your land, and how you clear your land. This is an important part of site preparation, and you should consider all the options available.

For example, you may have existing native vegetation emerging amongst gorse. Retaining gorse or other "weed" species may help your project. Focus on removing pest plants and environmental weeds (weeds harmful to native plants) that will persist even after your native planting has grown. These are plants such as shade tolerant ground cover or vine weeds.

Regional council guides will help you see what plants in your region are the most damaging to native regeneration and restoration.

What method should I use to clear my land?

The most common ways of clearing land for native planting are:

- using tools and machines;
- using chemicals;
- grazing.

Before you decide what method is best, you should:

- consider your terrain (not all methods are suitable);
- consider the costs;
- understand the risks;
- be aware of health and safety requirements.



The right tools and machinery set the stage for successful reforestation or revegetation efforts.

Tools and machinery to clear vegetation

You can clear your land manually with hand tools or by using heavy machinery. What you use depends on many things, including your land and vegetation cover.

Clearing vegetation

There are several methods to prepare your land for planting by flattening or chopping down standing vegetation.

Manual clearing

Manual clearing is best suited to smaller blocks of land. It is labour intensive and uses hand tools. It can include scrub cutting or line cutting to create rows to plant your seedlings into.

Motor manual land clearing

The most common motorised manual land clearing involves using tools like brush cutters or chainsaws.

- Brush cutters are best suited for use on light and medium density vegetation cover.
- Chainsaws are best suited for use on larger and woody vegetation cover.

Tractor crushing

Vegetation can be flattened by crushing it with the blade of a tractor or log skidder. The machine moves across the site with the blade above the ground. If heavy machinery is used on a site, be aware that this may compact soil and remove topsoil if not done with care.

Managing slash before replanting on ex-forestry sites

Slash is logging debris left behind when forestry trees have been harvested before changing cover to natives. Slash management to remove or redistribute slash can be done by bulldozer or excavator. It involves windrowing, mulching, or line blading and raking. Consider on-site processing of debris that can also put organic matter back into the soil. There are specialist operators that provide this service.

Windrowing

Windrowing clears most of the heavy slash from the planting area and leaves it in piled rows using bulldozers and excavators. This makes it easier to access the land for planting new seedlings and ensures they are planted into soil. Leaving some debris on site may also help to deter deer from entering the planting area.

Mulching

Mulchers attached to excavators or tractors break slash into a coarse chip-like mulch. Mulch left on the soil surface can control weed growth and is an alternative to chemical spraying.

Line blading and line raking

Line blading and raking are similar processes. They clear lines through sites covered in heavy slash or scrub. Bulldozers and excavators are used for line raking, while only bulldozers are used for line blading.

Agrichemical spraying to clear land

Using herbicides is a common practice to control competing vegetation before and after planting. What you use will depend on your planted area, vegetation cover, what you're planting and how the chemicals might affect your seedlings. There are health and safety risks involved in chemical use. Read this whole section before spraying herbicides.

You also need to think about weather conditions and when you should start your spraying. It's important to get timing right when using agrichemicals. Herbicides need to be applied during the active growing season of the weed species. This is usually spring and autumn.

What types of chemical spraying are there?

Some herbicides, such as glyphosate, kill weeds on application and leave no residue in the soil. Others, called residual herbicides, can continue to be effective for some time after application because they persist in the soil. Care must be taken with residual herbicides. Due to their longevity in soil, they can have an impact on seedlings that are subsequently planted.

There are three main ways to apply herbicides:

- individual spot spraying;
- blanket spraying the whole site;
- cutting and pasting individual vine, woody and scrub weeds.

If pest trees, such as sycamore, are on your site, you can treat them with herbicide through techniques such as drill and fill, ring barking, or basal spraying.

Different species of pest plants need different chemicals to treat them, as well as different methods for removal. Regional councils generally provide good information on treating pest plants. For information about weed species and treatments to use, see the *Weedbusters* website (weedbusters.org.nz).

Preparation before planting

Spot spraying

If your planted area is small, you might want to do pre-plant spot spraying. This allows you to spot spray at the intended planting density. It also uses less chemical and reduces the risk of spray drift.

With some chemicals, you can spot spray and plant the next day, while others need time for the vegetation to die off and be visible. A residual herbicide may remain in the soil for some time, so you'll need to delay planting. Ensure that you take note of the withholding period (the period between spraying and planting) for any chemical that is used. Be careful to ensure correct spot size is maintained as more chemical on a smaller spot will have a higher concentration.

Blanket spraying

Blanket spraying is effective and time efficient for higher density planting and larger planting areas. On some sites, it can be done using a knapsack sprayer. On very large sites, it can be done by helicopter, or machine on flat terrain. It's a useful form of spraying to knock down vegetation quickly on unproductive pastoral land or cutover forestry land.

If you're undertaking blanket spraying at a larger scale, keep an eye on your soil and monitor for other environmental impacts, such as soil or surface erosion and dried out ground, which could result in reduced survivability.

You should use professionals for this form of spraying who will provide advice on the correct chemical composition for your land. For example, woody and weedy cover will need different chemicals to gorse or herbaceous cover. Be aware that when treating land at scale, you may also impact existing native vegetation already on site. It is important to avoid spraying these remnants, to protect them.

Identify the different land uses on neighbouring properties. For example, if there are adjacent horticultural properties, aerial spraying of herbicides will need extra planning and supervision.

Cutting and pasting

For scattered pest plants, or where you wish to limit the use of chemicals, cutting and pasting stems of vines and weeds with herbicide is a good option. This limits the amount of chemical that is used. As with any herbicide, familiarise yourself with the effects of the chemical being applied and its potential to translocate (move from one plant to another) into surrounding, desirable vegetation.

When cutting and pasting, it's essential that the herbicide is applied to the cut stem within 30 seconds of it being cut. This ensures the poison travels through the plant while the sap is still running. Some plants may need more than one treatment if they sprout from cut stems. Different pest plants will need different products. For advice, refer to the *Weedbusters* website (weedbusters.org.nz).

When is the best time to treat pest plants?

One of the biggest considerations when using chemicals is time. If you do not get the timing right, you can lose money as your treatment will be less effective. This can vary depending on the method used, but in most instances, herbicides should be applied during the growing season. Familiarise yourself with the plant being treated, the chemical being used, and the method you intend to use.

What other factors should I consider?

Other than time, there are several things you need to think about, including:

- weather conditions as wind can cause your spray to drift, and heavy rain can cause soil loss and degradation and wash away chemicals;
- getting grass low for less chemical usage and easier application;
- having enough time before planting for chemicals to break down and kill vegetation;
- allowing a longer period if you pre-plant spot spray so you can see where to plant;
- allowing time for more than one spray (you may need to spray the year before you plant);
- the best type of spraying for your land.

Who should I talk to about chemical spraying?

Different regional councils have different rules about notification when spraying large areas. In some instances, you may need to notify your neighbours, while in other regions this is only required when using motorised spray.

If you're treating large areas, talk to your regional council land management officer as the use of chemicals is regulated by councils and the Resource Management Act 1991. They can help you find someone to talk to about using chemicals and the best approach for your land. Agrichemical providers and contractors are also a useful source of advice.



Kōwhai trees play a crucial ecological role in native forests and ecosystems. They provide nectar for pollinators and food for native birds. Their nitrogen-fixing abilities also contribute to soil fertility.

Will chemicals affect my seedlings?

Do not use any chemicals without learning about the impacts on both human and plant health. There are factors that can cause unwanted plant loss if not understood. These include:

- how long you should withhold planting after application;
- translocation (movement from one plant to another) of the herbicide;
- residual effects (how long the herbicide stays active in the soil).

If you're planting native species, you need to take extra care as they are generally more susceptible to chemical effects. To protect the seedling, use plant guards or a spray guard when applying herbicides. Plant guards will also protect your seedlings from browsing by rabbits and hares – and reduce desiccation (drying out) from wind.

If your planting area is small, you may prefer to use hand tools rather than chemicals.

For information on using herbicides when preparing grass sites for planting natives, see the *Tāne's Tree Trust* website (tanestrees.org.nz).

Health and safety when using chemicals

There's a lot to consider when you use chemicals to clear your land. You may wish to do a course on the safe handling of chemicals, for example through *Growsafe* (growsafe.co.nz).

Make sure you:

- follow product labels and safety data sheets;
- follow the recommendations of manufacturers;
- clean equipment if using it for different herbicides to avoid contamination;

- use herbicides at the appropriate rate as per instructions;
- use protective clothing and wear a respirator;
- use the most appropriate equipment;
- avoid drift spray to neighbouring properties and waterways;
- spray in calm conditions and when no rain is expected;
- prevent species from being sprayed that are not meant to be.

Post-planting maintenance after spraying

Within two to three months of planting, it is likely you'll need to do some releasing (applying herbicides or hand weeding). For hand weeding, you can use tools to remove long grass or choking weeds, but it's labour intensive. For applying herbicides, this could be spot spraying or blanket spraying over the entire site. If you blanket spray, you should be cautious of spraying seedlings.

There are specific chemicals that will affect certain types of plants but have little or no impact on others. For instance, there are products that kill grass plants, but not shrubby plants. Again, understanding what a chemical is used for, how to use it, and what its impact will be is critical.

You'll need to prevent other vegetation from competing with your native seedlings for up to four years. The new native forest canopy should close about three to five years after planting depending on density and species. This will reduce weed and grass competition as most pest plants prefer open, sunny sites. There will still be more shade tolerant pest plants that persist. You should use cutting and pasting and careful spraying to treat shade tolerant pest plants as this will reduce accidental loss of your plants.

Grazing to clear land

If you are grazing to clear your land, you need to consider when to do it and the risks involved.

When should I graze?

If your land is pastoral, you may look to graze intensively with livestock before planting. This will reduce grass length and make it easier to plant through.

Your seedlings will start to grow in the spring. You may not need to do any additional clearing if the seedlings have shot up and are competing against the cover.

If your seedlings have not shot up, you may need to do some releasing (applying herbicides or hand weeding) to help get your trees established.

Once you have taken the care to plant and nurture your seedlings, you should stop animals from grazing – at least until the plants are a few years older. Most native plants are attractive to animals.



Grazing helps reduce competition from existing vegetation. It allows newly planted trees to establish more effectively.

Controlling animal pests

Animal pests such as deer, goats, hares and rabbits can have a devastating effect on native plantings. You need a plan to protect your plants.

Hares and rabbits

Hares and rabbits browse young trees planted in grassland. Hare damage can be identified by bark chewing and cut stems, usually at a 45-degree cut angle.

Plant guards may be effective at protecting plants against hares and rabbits, and you can control both by shooting if there is a large population. You can also use a poison bait such as Pindone for rabbits. Unlike rabbits, hares will not eat poison baits. You must take care if you're using a bait. It's important to read all advisory information or discuss your plans with the regional council.

Deer and goats

Plant guards will have limited effect against deer or goats. These pest animals browse native understorey as high as they can reach. If wild deer or goats are present on your property, you should consider culling them ahead of any planting project. This is most effective when co-ordinated with neighbouring properties.

Control methods for deer and goats range from catch pens, shooting, or being rounded up by dogs. You can also use fencing to protect an area from deer and goats. The height and design of the fence needs to prevent goats from climbing over. This is generally an expensive option.

Plant species

Some species of native plants are less appetising to animals than others, although few can escape pest animals entirely. Species such as totara and mānuka are less attractive than most other native species. Some plants that might appear less palatable are in fact highly desirable to browsing animals, for example tī kōuka (cabbage trees).

Further advice on dealing with pest animals

If you have a pest animal problem, speak with your local council biosecurity officer or land management officer to determine the best approach.

Fencing your site

Part of your land preparation activity for planting trees is getting fences set up. The type of fencing you need depends on your terrain, what you're planting and what you want to keep away from your trees. Fencing may not be necessary if you do not have stock on your land, and you don't want to use fencing to control pests like deer and goats.

Before fencing your site

There are things you need to think about before you put in a fence:

- Do you have a natural boundary?
- Do you have waterways or wetlands?
- Will your new fence allow access to maintain your plantings?
- Are you planting near an existing fence line or modifying your borders to where you want to plant?
- Are you upgrading an existing fence to make it stock proof?
- What are the costs and benefits of different fences?
- How long do you need to protect your trees? You may only need temporary fencing.

Is fencing the best option?

Fencing might not always be the best choice. For example, you might find the cost of fencing is better spent on effective pest control.

When to fence your site

Fencing is important to keep animals you are grazing yourself, such as sheep and cattle, away from browsing (eating) your seedlings. It can also stop other animals, such as deer and goats, from damaging your trees if you can install a suitable fence.

You should fence before you begin planting. This will give your seedlings a better chance of establishment and survival.

Pest-proof fencing is designed to exclude certain pests, such as hares and rabbits, from planting sites. These fences can be equipped with features like overhangs or skirt extensions to stop pests from climbing or burrowing underneath.



Where you should fence

Build your fences:

- straight up hills rather than around them;
- up and down ridgelines;
- following logical boundaries.

Tips when building fences

- Build fences in favourable weather conditions. If the weather is too wet, the posts might move and it's harder to use machinery. If the weather is too dry, it's more difficult to dig.
- Do not fence where your animals have got higher ground on one side so they can jump over it.
- Waterway fences need to be far enough back to allow for flooding.

Tips when building gates

- Build logical sized gateways for your needs. Think about what vehicles or farm machinery you need to fit through.
- Allow enough space for vehicles to turn into the paddock.
- Place your gates where your stock naturally runs. For example, gateways in paddock corners are normally easier to shift stock through than gates in the middle of a fence line.

Types of fencing

Your fencing type will depend on what animals or pests you need to keep away from your trees. Common fence types include:

- **Post and batten** – good for sheep and cattle. Also used for boundary fencing. It is strong and secure but expensive and labour intensive to erect.
- **Electric** – good for dairy cows. Cheaper, easier, and faster to erect but not as secure and does not last as long as a post and batten fence.
- **Wire netting** (about one metre high) – good for sheep or young stock.

- **Post and rail** – good for horses.
- **Deer netting** – good for deer and goats.

Predator fencing can keep everything out by using 5mm mesh and curved guards but is extremely expensive to construct.

Boundary fences

Boundary fences signify the legal boundary of your property. Minimum requirements are defined under the Fencing Act 1978.

Reach an agreement with your neighbour about the type of fence and how you'll share the costs. If you want a better-quality fence than the minimum specified under law, you may have to meet the extra costs yourself.

Not sure about the best type of fence?

Getting the right fence may cost more upfront, but it can work out more cost efficient in the long run. Get good advice before you start. It can be costly and you want to get it right the first time.

Farm supply stores and fencing contractors will be able to offer you advice. Other places you can go for information include the websites for *Lifestyle Block* (lifestyleblock.co.nz) and *DairyNZ* (dairynz.co.nz).

Fencing maintenance

Regular maintenance will extend the life of a fence. Fences are cheaper to repair than replace.

Regularly check your fence lines for:

- broken or loose wires and battens;
- any solid posts that have moved, lifted or broken;
- any rusting on post staples (you may need to pull some staples out to check this);
- holes in netting;
- shorting out of electric fences;
- broken electric insulators.

More information

Canopy website

For more information about planting trees, visit canopy.govt.nz

Or scan the QR code using your phone's camera.



Forestry advisory service

The forestry advisory team at the Ministry for Primary Industries can help you make decisions about growing trees and establishing forests.

To contact a forestry adviser, email forestsERVICEadvice@mpi.govt.nz

For more information about the forestry advisory service, visit mpi.govt.nz/forestry-advisory-service

Or scan the QR code using your phone's camera.





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